

Amendments to Claims

1. (currently amended) A device for absorption of impact energy when fixed in use to a vehicle body component, said device comprising one or more deformable members of shape memory material aligned for deformation by an impact on said device, each of said deformable members having a first strength level at an operating temperature of the device and a second strength level at a higher temperature, and each of said deformable members being selectively heatable from said operating temperature to said higher temperature to tune the energy absorption capacity of the device.

2. (original) The device recited in claim 1 in which said member or members are aligned between a vehicle bumper and a vehicle body rail.

3. (currently amended) The device recited in claim 1 comprising:

a crash box having an inlet end;

a ram having a first end partially inserted into the inlet end of the box and a second end, the ram being aligned when fixed in use to receive an impact on said vehicle body at the second end and to be driven by said impact further into said crash box; and

one or more of said deformable members, said deformable member(s) having two ends with one end being fixed to said box and the other end fixed to said ram for absorption of impact energy by stretching of the deformable members.

4. (currently amended) The device recited in claim 1 in which a said deformable member is a shape memory metal alloy.

5. (currently amended) The device recited in claim 1 in which a said deformable member is a shape memory metal alloy comprising titanium and nickel, and said deformable member has a relatively low strength martensite phase at said operating temperature and a higher strength austenite phase at said higher temperature.

6. (currently amended) The device as recited in claim 3 in which a said deformable member comprises a spring.

7. (withdrawn) The device as recited in claim 3 in which said deformable member comprises a sheet

8. (withdrawn) The device as recited in claim 3 in which said deformable member comprises a roll of sheet material.

9. (withdrawn) The device as recited in claim 3 in which said deformable member comprised a collapsible tube.

10. (withdrawn) The device as recited in claim 3 in which said deformable member comprises a set of concentric tubes.

11. (currently amended) A device for absorption of impact energy when fixed in use to a vehicle body component, said device comprising one or more deformable members of a shape memory material ~~metal alloy~~ aligned for deformation by an impact on said device, said members being deformable from an initial shape under an impact of predetermined magnitude and thereafter restorable to their initial shape upon being heated to a predetermined temperature; said members having a first strength level at an operating temperature of said device and a second strength level at a temperature above the operating temperature; and
an electrical connection to each of the deformable members for selectively heating one or more individual deformable members by electric resistance heating to tune the energy absorption capacity of the device.

12. (currently amended) The device for absorption of impact energy as recited in claim 11 in which said one or more deformable members are of a shape memory metal alloy ~~are electrically conductive and restorable to their initial shape upon being heated by electrical resistance heating to a predetermined temperature~~ having a first strength level at an operating temperature of said device and a second and greater strength level at a temperature above the

operating temperature; such that individual deformable members can be selectively heated to increase the energy absorption capacity of the device.

13. (currently amended) The device for absorption of impact energy as recited in claim ~~12~~ 11 in which said one or more deformable members comprise titanium and nickel.

14. (currently amended) A device for absorption of impact energy when fixed in use to a vehicle body component, said device comprising:

a crash box having an inlet end;

a ram having a first end partially inserted into the inlet end of the crash box and a second end, the ram being aligned when fixed in use to receive an impact on said vehicle body at the second end and to be driven by said impact further into said crash box;

one or more deformable members of shape memory material, said members being deformable from an initial shape under an impact of predetermined magnitude and thereafter restorable to their initial shape upon being heated to a predetermined temperature, said deformable member(s) having two ends with one end being fixed to said box and the other end fixed to said ram for absorption of impact energy;

said members having a first strength level at an operating temperature of said device and a second strength level at a temperature above the operating temperature; and

an electrical connection to each of the deformable members for selectively heating one or more individual deformable members by electrical resistance heating to tune the energy absorption capacity of the device. and

~~means for heating said one or more deformable members.~~

15. (currently amended) The device recited in claim 14 in which a said deformable member is a shape memory metal alloy having a first strength level at an operating temperature of said device and a second and greater strength level at a temperature above the operating temperature; such that said deformable member can be selectively heated to increase the energy absorption capacity of the device.

16. (currently amended) The device recited in claim 14 in which a said deformable member is a shape memory metal alloy comprising titanium and nickel.

17. (currently amended) The device recited in claim 1 in which a said deformable member is a shape memory polymer or a combination of a shape memory alloy and shape memory polymer.

18. (currently amended) The device recited in claim 14 in which a said deformable member is a shape memory polymer or a combination of a shape memory alloy and shape memory polymer.

19. (new) The device recited in claim 1 in which a said deformable member is a shape memory polymer, and each said deformable member has a relatively high strength at said operating temperature and a lower strength at said higher temperature.

20. (new) The device recited in claim 14 in which a said deformable member is a shape memory polymer, and each said deformable member has a relatively high strength at said operating temperature and a lower strength at said higher temperature.